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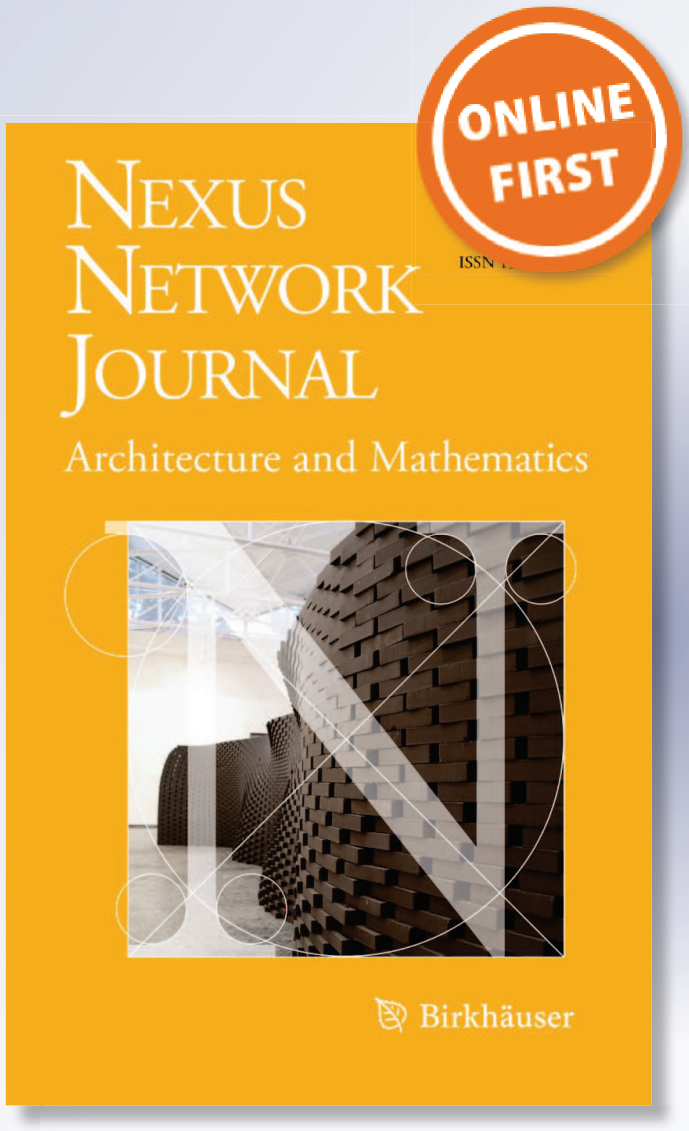

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Research

Grid-Based Design in Roman Villas: A Method of Analysis

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Abstract. The perceivable regularity of some Roman villas can be understood in the context of a grid-based design. In this paper we try to clarify the requirements under which we may consider that a villa has an outline based on a grid and we quantify the accuracy of the correspondence between a villa's plan and a given grid. We follow this approach with some Roman villas in Portugal and use the grids as tools for the analysis and the reconstruction of their plans.

Keywords: Roman architecture, grids, modules, design analysis, Pythagorean triangle, villas

1 Introduction

When studying Roman villas, we often find that their overall layout exhibits a perceivable degree of regularity, which becomes even more evident when we superimpose a grid on the plan of a villa. We also observe that the measures of individual rooms usually do not yield integer numbers of Roman feet, or of any others ancient units of length, because the thickness of the walls occupies part of the standard areas provided by the regular division of the space.

Generally, given a grid, we accept that a wall is in accordance with the grid if its direction corresponds to one direction of the grid, and there is a line that either goes through the inside of the wall, or along one of its faces. This wall-by-wall study requires a careful translation into a global analysis of the villa. Therefore, our first goal is to suggest a method to measure the accuracy with which a particular villa fits into a grid-based structure.

The process of looking for a grid that describes the regularity of a villa is a good method of analysis, revealing different sections of the plans – for example, only one section fits a given grid while the others are irregular or fit another grid, or there are portions of the plan whose correspondence to a grid is much more accurate than the rest – and enhancing particular strategies in the definition of the original plan, such as stretching, shrinking or distorting shapes. After having accepted a grid-based design, and established a grid with a given tolerance, that grid is a basic tool for the reconstruction of the villa's plan.

1.1 A non-ideal grid

Given a villa, we ask if there was the previous definition of a grid, on the terrain, when it was laid out. This could be due either to the existence of a grid-based project or to a practical procedure, as from a layout whose measures were not totally determined.

When we look for proportions, or other mathematical ideas, in a given building, we must be aware that rigorous mathematical content is garbled by the several steps between

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